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FOREST STATISTICS FOR
EASTERN TENNESSEE

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A REPORT OF THE SOUTHERN FOREST SURVEY

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THE SOUTHERN FOREST SURVEY

The Southern Forest Survey, an activity of the Southern Forest Experiment Station, covers the seven States of the Station's territory--Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. This Survey is a part of the nation-wide Forest Survey authorized by the McSweeney-McNary Forest Research Act of 1928. Its five-fold purpose is (1) to take inventory of the supply of standing timber and other forest products; (2) to ascertain the rate at which this supply is being increased through growth; (3) to determine the rate at which this supply is being diminished through industrial and local use, and by fire, insects, disease, and other agencies; (4) to estimate the present requirements and the probable future trend in the requirements for timber and other forest products; and (5) to correlate these findings with existing and anticipated economic conditions, in order that policies may be formulated for the effective use of lands suitable for forest production.

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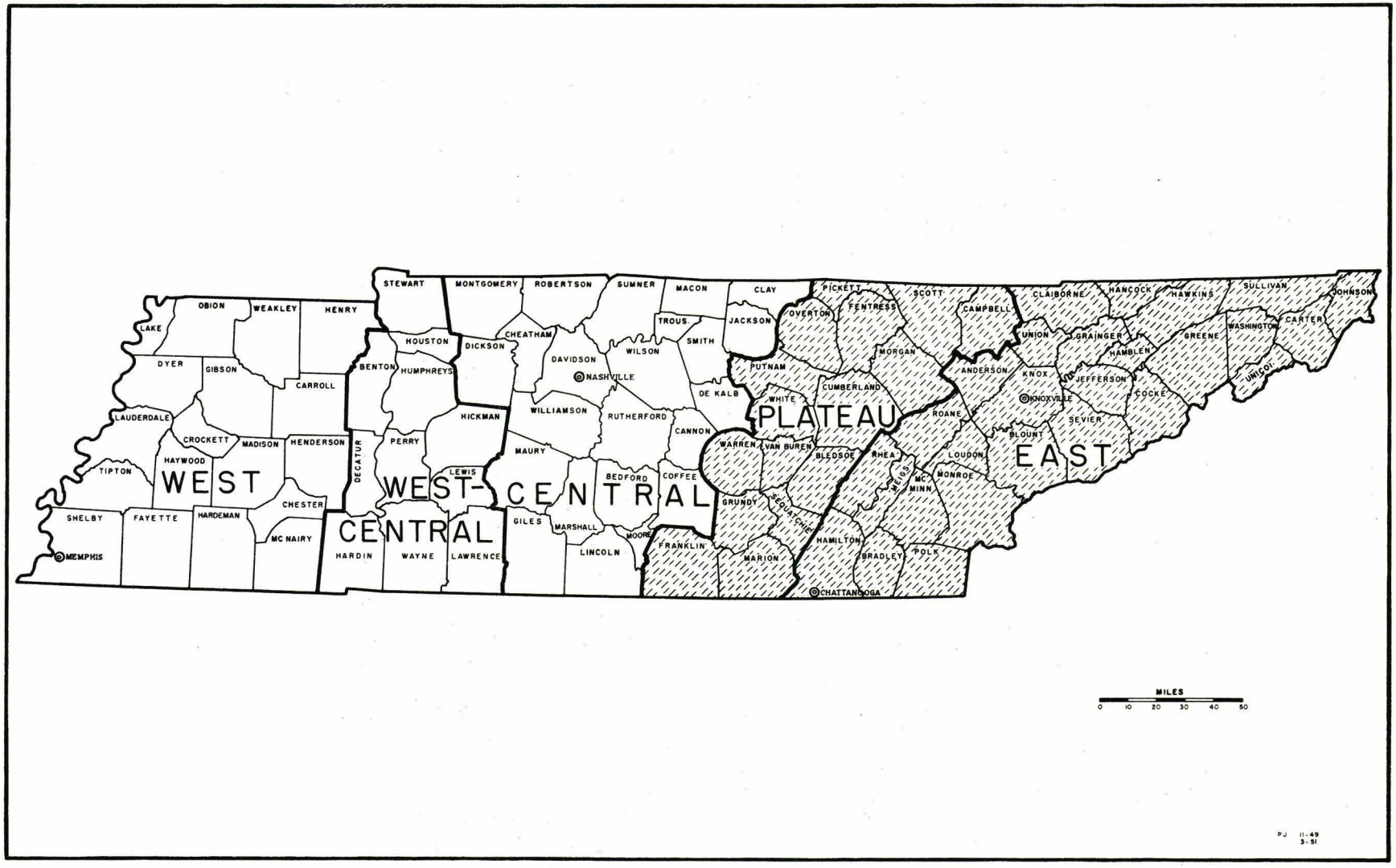


Figure 1.--Forest regions in Tennessee. (Regions included in this report are the shaded portions of the map.)

FOREST STATISTICS FOR EASTERN TENNESSEE

This publication summarizes the data on forest acreage and timber volume collected by the Southern Forest Survey in east Tennessee and in the Plateau region of the State (figure 1). The survey was made between January and November 1950. The western and central portions of Tennessee were surveyed in 1948-49.

Highlights

East Tennessee is made up of two physiographic areas--the Unaka and Smoky Mountains and the Great Valley. The mountains, which extend along the North Carolina line in a strip 2 to 20 miles wide, are rough and rugged. Most of the mountains remain a forested wilderness now in public ownership. The Great Valley, which flanks the Smokies, is 30 to 60 miles wide. Its floor is composed of a succession of minor valleys and ridges which rise 300 to 800 feet. Many of the slopes are steep and forested, although spotted with thousands of tiny "patch farms." In the valleys are found some deep soils and many prosperous farms. This is the most heavily industrialized region of the State, a reflection of the availability of a large variety of minerals and other raw materials and low-cost electric power and fuel. Of the $957.5 million of the gross income originating in manufacture in the State in 1947, about 40 percent was produced in this region alone. Chattanooga, Knoxville, and Kingsport are the principal manufacturing centers.

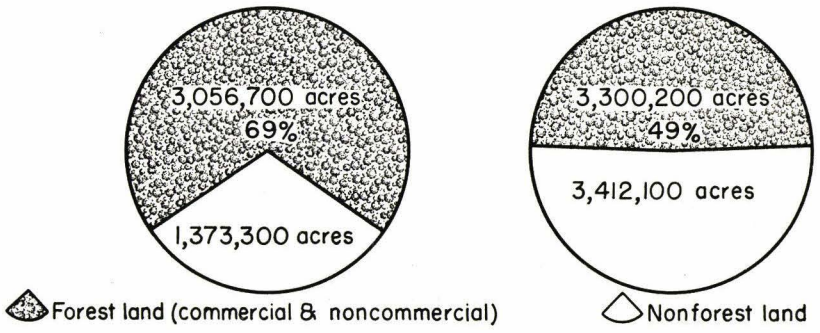
About half of the 6.7 million acres of land in east Tennessee is forested. With more than three-fourths of its forest well stocked, this region has the highest proportion of good stocking of any region in the State. Total growing stock amounts to 1,428 million cubic feet. Thirty-seven percent is softwood--principally southern pines, white pine, hemlock, and cedar--the largest regional concentration of softwoods in the State. Sawlog volume totals 3,095 million board feet in hardwood species, 1,835 in softwoods. On a per acre basis, hardwood types average 1,575 board feet of sawlog volume; softwoods types average 1,668 board feet.

The Plateau region takes in the Cumberland Plateau and most of the eastern Highland Rim. The Cumberland Plateau, averaging about 2,000 feet in elevation, rises a thousand feet above the Great Valley. This is the area which supplies most of Tennessee's coal, the State's most valuable mineral product. Its soils are mainly thin, porous, and unproductive for farming. The Highland Rim has a flat to rolling topography for the most part. Some of its soils are suited to crops, although they quickly need fertilizer; other soils found on the inner part of the Rim are among the poorest in the State.

FOREST ACREAGE

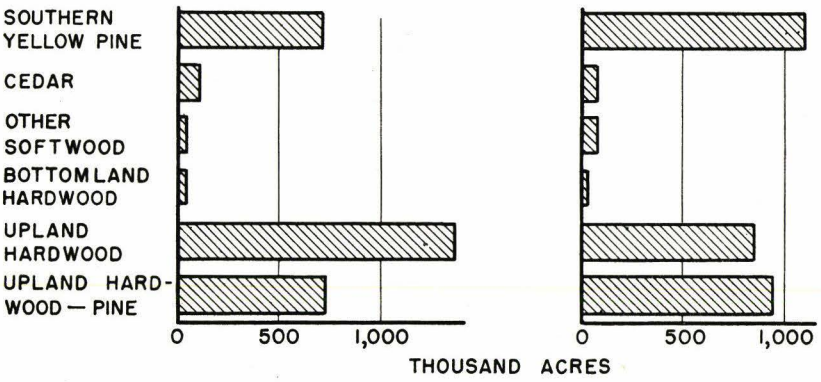
FOREST LAND

The Plateau region is the most heavily forested area in the State.



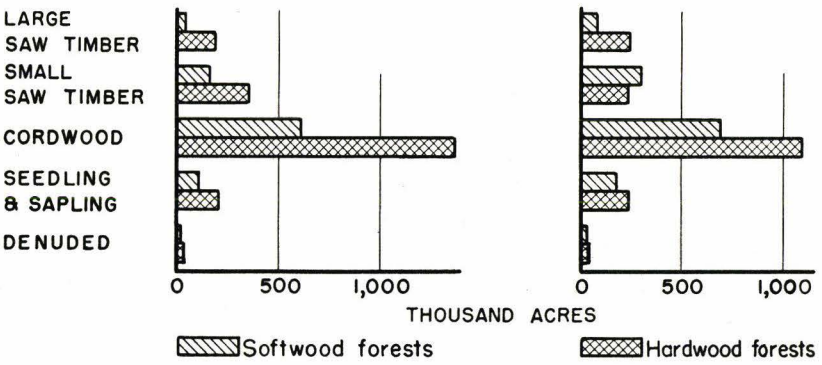
FOREST TYPE

In both regions, upland hardwood types predominate; there is also a large acreage of southern yellow pine.



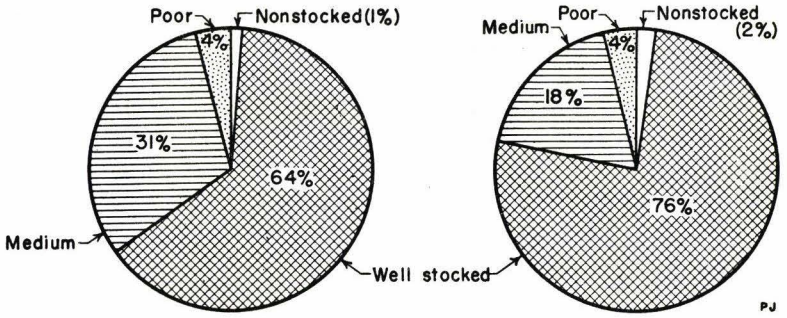
STAND SIZE

Cordwood stands predominate in the hardwood and softwood forest types of both regions.



FOREST STOCKING

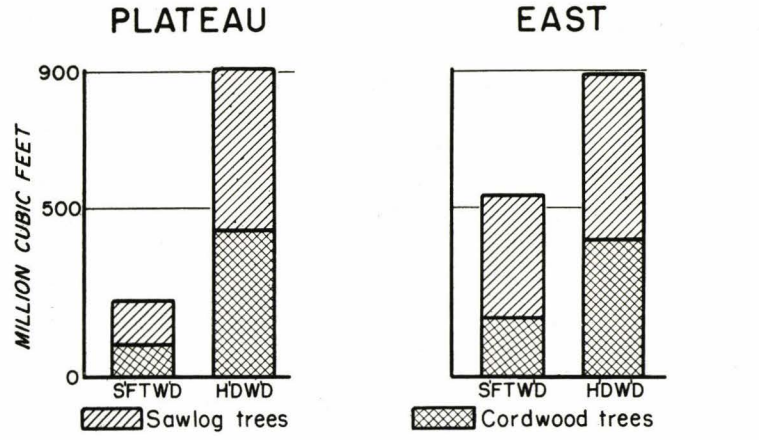
Considering all well formed trees, including established seedlings, more than two-thirds of the forest land is well stocked. East Tennessee has the best stocking in the entire State.



TIMBER VOLUME

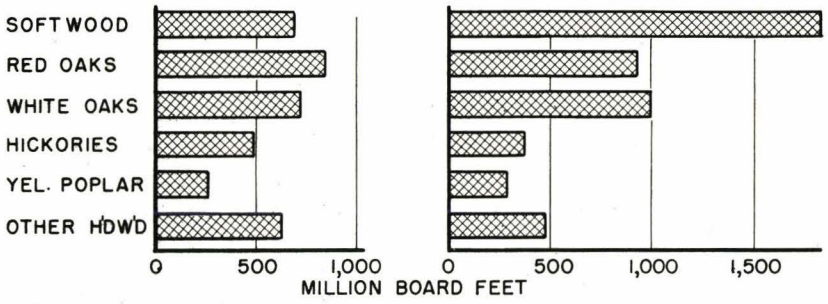
TOTAL GROWING STOCK

Hardwoods make up 80 percent of the growing stock in the Plateau region, 63 percent in east Tennessee. More than half the total growing stock is in sawlog trees.



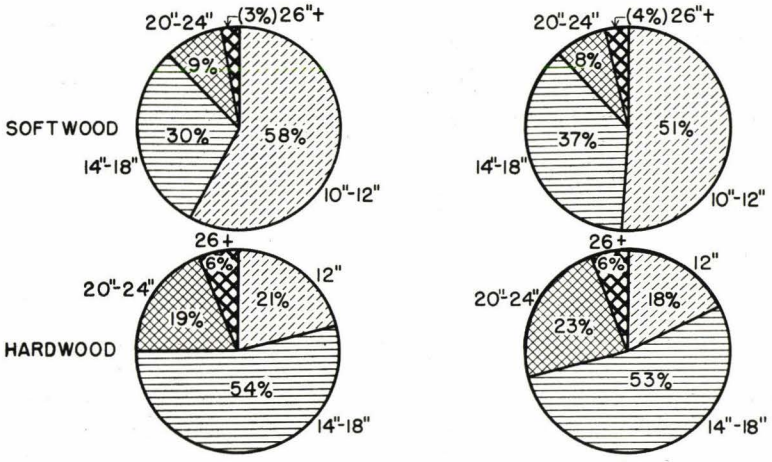
SAWLOG VOLUME BY SPECIES GROUP

In terms of saw timber, oaks constitute the largest species group.



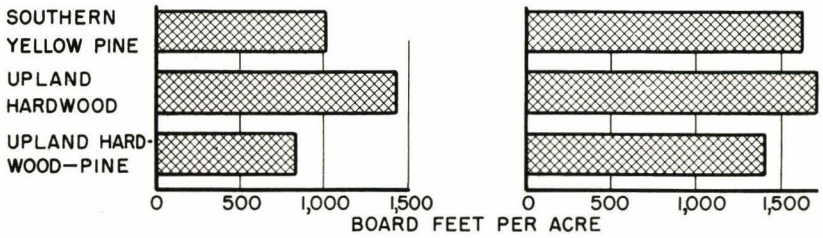
SAWLOG VOLUME BY TREE DIAMETER

Hardwood sawlog volume is concentrated in the 14"–18" d.b.h. group in both regions; softwood in the 10"–12" group.



SAWLOG VOLUME PER ACRE BY FOREST TYPE*

Considering only sawlog trees, all forest types are rather poorly stocked. The average is 1,201 bd.ft. per acre in the Plateau region and 1,613 bd. ft. per acre in east Tennessee.



*Samples for types not shown are too small to be reliable.

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The Plateau region is the most heavily forested in the State; seven-tenths of its 4.4 million acres of land is forested. Total growing stock amounts to 1,132 million cubic feet, 80 percent of it hardwood. Sawlog volume totals 3,671 million board feet. It averages 1,241 board feet per acre in hardwood types; 1,108 board feet per acre in softwood types.

Definitions of terms used in this report will be found in the appendix.

Accuracy of the Data

Data were obtained from a sampling of aerial photographs and from on-the-ground measurements on pairs of quarter-acre sample plots located every 3 miles on lines 3 miles apart throughout eastern Tennessee. Statistical analysis of the data for the two Survey regions indicates a sampling error of 1 percent for the estimate of total forest area, 3 percent for total cubic-foot volume, and 4 percent for total board-foot volume. As these totals are broken down by region, county, forest type, species, and other subdivisions, the possibility of error increases and is greatest for the smallest items.

The maximum sampling error to which the estimates are liable, on a probability of two chances out of three, is approximately as follows:

Maximum sampling error in forest area		Maximum sampling error in cubic-foot volume		Maximum sampling error in board-foot volume	
Thousand acres	Percent error	Million cu. ft.	Percent error	Million bd. ft.	Percent error
3,000	1	1,400	3	5,000	4
1,500	1	500	6	2,500	6
500	2	100	12	500	13
50	7	10	39	50	43

The estimates of sampling error do not include errors in volume tables, cull allowances, or other such measurements. Methods of estimating errors of this type have not been developed.

Table 1.--Forest and nonforest land area by Survey region, 1950

Land use	Plateau	East
	Thousand acres	
Forest:[1]		
Commercial	3,056.7	3,057.5
Reserved-commercial	...	242.7
Total	3,056.7	3,300.2
Nonforest	1,373.3	3,412.1
All land	4,430.0	6,712.3

1/ The acreage of forest land incapable of producing commercial timber is negligible.

Table 2.--Forest land by class of ownership and Survey region, 1950

Class of ownership	Commercial forest			
	Plateau		East	
	Thousand acres	Percent	Thousand acres	Percent
Private:				
Farm[1]	721.8	23.6	1,225.5	40.1
Other	2,152.8	70.4	1,118.2	36.6
Total private	2,874.6	94.0	2,343.7	76.7
Public:[2]				
National forest	...	...	563.3	18.4
T.V.A.	20.5	.7	108.1	3.5
Other federal	11.6	.4	34.1	1.1
State	148.5	4.9	3.0	.1
County and municipal	1.5	(3/)	5.3	.2
Total public	182.1	6.0	713.8	23.3
All ownership	3,056.7	100.0	3,057.5	100.0

1/ Based on 1945 Census of Agriculture.
2/ Compiled in 1949.
3/ Negligible.

Table 3.--Land area and commercial forest by county, 1950[1/]

County	All land	Commercial forest	
	Thousand acres	Thousand acres	Percent
Anderson	216.3	136.4	63.1
Bledsoe	258.6	186.9	72.3
Blount	373.8	119.4	31.9
Bradley	216.3	94.8	43.8
Campbell	286.1	216.8	75.8
Carter	227.2	138.7	61.0
Claiborne	284.8	160.4	56.3
Cocke	277.8	127.4	45.9
Cumberland	434.5	360.9	83.1
Fentress	319.4	229.2	71.8
Franklin	359.0	184.1	51.3
Grainger	198.4	83.3	42.0
Greene	394.8	134.7	34.1
Grundy	229.1	188.9	82.5
Hamblen	111.4	29.2	26.2
Hamilton	368.6	174.9	47.4
Hancock	147.8	78.7	53.2
Hawkins	316.2	142.1	44.9
Jefferson	203.5	54.3	26.7
Johnson	191.4	115.5	60.3
Knox	330.9	112.4	34.0
Loudon	153.6	54.9	35.7
McMinn	278.4	106.7	38.3
Marion	324.4	249.5	76.9
Meigs	136.3	58.9	43.2
Monroe	425.6	252.4	59.3
Morgan	344.9	285.8	82.9
Overton	282.9	144.8	51.2
Pickett	111.4	68.7	61.7
Polk	279.0	202.7	72.7
Putnam	261.2	127.3	48.7
Rhea	214.4	119.9	55.9
Roane	242.6	114.6	47.2
Scott	351.3	297.4	84.7
Sequatchie	174.7	139.8	80.0
Sevier	385.9	123.3	32.0

Table 3.--Land area and commercial forest by county, 1950[1/] (continued)

County	All land	Commercial forest	
	Thousand acres	Thousand acres	Percent
Sullivan	273.9	94.3	34.4
Unicoi	118.4	87.9	74.2
Union	135.7	71.8	52.9
Van Buren	163.2	134.7	82.5
Warren	282.9	120.3	42.5
Washington	209.3	67.9	32.4
White	246.4	121.6	49.4

1/ County data on sawlog and total growing stock, suitable for combining into county groups, are available as a supplement to this release.

Table 4.--Commercial forest land by stand size and forest type, by Survey region, 1950

Forest type	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Denuded
	Thousand acres					
PLATEAU						
Softwood types:						
Southern yellow pine	787.4	17.4	145.7	527.1	85.7	11.5
Cedar	97.7	7.8	...	72.4	17.5	...
Other softwood	38.7	8.3	8.2	16.9	5.3	...
Total	923.8	33.5	153.9	616.4	108.5	11.5
Hardwood types:						
Bottomland hardwood	37.3	13.4	5.8	18.1	...	...
Upland hardwood	1,367.5	144.7	254.9	857.6	100.5	9.8
Upland hardwood-pine	728.1	22.5	89.1	494.8	105.4	16.3
Total	2,132.9	180.6	349.8	1,370.5	205.9	26.1
All types	3,056.7	214.1	503.7	1,986.9	314.4	37.6
EAST						
Softwood types:						
Southern yellow pine	1,103.7	52.1	268.7	624.3	142.0	16.6
Cedar	69.7	...	3.5	32.2	28.0	6.0
Other softwood	69.4	18.2	19.6	29.2	2.4	...
Total	1,242.8	70.3	291.8	685.7	172.4	22.6
Hardwood types:						
Bottomland hardwood	12.5	5.0	2.5	2.5	2.5	...
Upland hardwood	857.0	137.9	95.6	500.2	113.7	9.6
Upland hardwood-pine	945.2	94.7	129.6	588.4	116.5	16.0
Total	1,814.7	237.6	227.7	1,091.1	232.7	25.6
All types	3,057.5	307.9	519.5	1,776.8	405.1	48.2

Table 5.--Commercial forest land by degree of tree stocking and forest type, by Survey region, 1950

Forest type	All stocking	Well stocked	Medium stocked	Poorly stocked	Non-stocked
	Thousand acres				
			PLATEAU		
Softwood types:					
Southern yellow pine	787.4	495.2	236.4	44.3	11.5
Cedar	97.7	53.3	32.0	12.4	...
Other softwood	38.7	13.8	18.7	6.2	...
Total	923.8	562.3	287.1	62.9	11.5
Hardwood types:					
Bottomland hardwood	37.3	18.6	18.7	...	...
Upland hardwood	1,367.5	913.1	413.4	31.2	9.8
Upland hardwood-pine	728.1	433.3	237.7	40.8	16.3
Total	2,132.9	1,365.0	669.8	72.0	26.1
All types	3,056.7	1,927.3	956.9	134.9	37.6
			EAST		
Softwood types:					
Southern yellow pine	1,103.7	843.8	197.5	45.8	16.6
Cedar	69.7	39.6	21.8	2.3	6.0
Other softwood	69.4	46.7	14.0	8.7	...
Total	1,242.8	930.1	233.3	56.8	22.6
Hardwood types:					
Bottomland hardwood	12.5	10.0	2.5	...	...
Upland hardwood	857.0	681.1	146.8	19.5	9.6
Upland hardwood-pine	945.2	732.3	160.2	36.7	16.0
Total	1,814.7	1,423.4	309.5	56.2	25.6
All types	3,057.5	2,353.5	542.8	113.0	48.2

Table 6.--Area of saw-timber stands by stand quality and forest type, by Survey region, 1950

Forest type	All qualities	Fair or better	Poor
	Thousand acres		
	PLATEAU		
Softwood types:			
Southern yellow pine	163.1	52.8	110.3
Cedar	7.8	5.2	2.6
Other softwood	16.5	5.6	10.9
Total	187.4	63.6	123.8
Hardwood types:			
Bottomland hardwood	19.2	11.3	7.9
Upland hardwood	399.6	196.9	202.7
Upland hardwood-pine	111.6	31.2	80.4
Total	530.4	239.4	291.0
All types	717.8	303.0	414.8
	EAST		
Softwood types:			
Southern yellow pine	320.8	105.9	214.9
Cedar	3.5	3.5	...
Other softwood	37.8	8.6	29.2
Total	362.1	118.0	244.1
Hardwood types:			
Bottomland hardwood	7.5	2.5	5.0
Upland hardwood	233.5	158.3	75.2
Upland hardwood-pine	224.3	126.3	98.0
Total	465.3	287.1	178.2
All types	827.4	405.1	422.3

Table 7.--Basal area per acre of growing stock[1] and cull trees by forest-type group and Survey region, 1950

Forest type	Plateau	East
	Square feet	
Softwood types:		
Growing stock	42.9	53.0
Cull trees	10.5	7.2
Total	53.4	60.2
Bottomland hardwood:		
Growing stock	56.3	73.8
Cull trees	28.3	14.6
Total	84.6	88.4
Upland hardwood:[2]		
Growing stock	40.1	47.8
Cull trees	14.8	11.6
Total	54.9	59.4
All types:		
Growing stock	41.1	50.1
Cull trees	13.7	9.8
Total	54.8	59.9

1/ Includes sound, well-formed 2- and 4-inch trees.
2/ Includes upland hardwood-pine.

Table 8.--Total volume by class of timber and species, by Survey region, 1950

Species	All timber 1/	Growing stock: All trees	Growing stock: Sawlog trees: Sawlog portions	Growing stock: Sawlog trees: Tops	Growing stock: Cordwood trees	Tops and limbs	Cull trees
	Million cubic feet						
PLATEAU							
Softwood:							
Southern pines	192.6	187.4	94.8	13.0	79.6	...	5.2
Cedar	9.0	8.4	3.1	.5	4.8	...	.6
White pine	9.5	9.3	5.0	.8	3.5	...	.2
Hemlock	24.1	22.8	17.9	2.4	2.5	...	1.3
Total	235.2	227.9	120.8	16.7	90.4	...	7.3
Hardwood:							
Red oaks	421.1	249.9	133.0	...	116.9	80.0	91.2
White oaks	451.3	246.8	116.1	...	130.7	73.3	131.2
Hickories	244.4	162.1	79.4	...	82.7	43.1	39.2
Yellow-poplar	91.6	65.0	41.8	...	23.2	18.5	8.1
Sweetgum	9.3	6.8	2.4	...	4.4	1.4	1.1
Black & tupelo gums	85.6	36.9	27.5	...	9.4	16.8	31.9
Other hardwoods	318.2	137.0	68.9	...	68.1	42.9	138.3
Total	1,621.5	904.5	469.1	...	435.4	276.0	441.0
All species	1,856.7	1,132.4	589.9	16.7	525.8	276.0	448.3

Table 8.--Total volume by class of timber and species, by Survey region, 1950 (continued)

Species	All timber 1/	Growing stock				Tops and limbs	Cull trees
		All trees	Sawlog trees		Cordwood trees		
			Sawlog portions	Tops			
	Million cubic feet						
EAST							
Softwood:							
Southern pines	451.7	446.3	257.7	33.5	155.1	...	5.4
Cedar	11.6	10.9	4.0	.7	6.2	...	.7
White pine	45.7	43.9	33.3	4.3	6.3	...	1.8
Hemlock	34.6	30.9	23.2	2.9	4.8	...	3.7
Total	543.6	532.0	318.2	41.4	172.4	...	11.6
Hardwood:							
Red oaks	388.4	236.2	146.9	...	89.3	84.5	67.7
White oaks	459.4	271.5	158.4	...	113.1	97.7	90.2
Hickories	168.3	111.5	61.2	...	50.3	32.0	24.8
Yellow-poplar	124.2	96.6	45.6	...	51.0	20.4	7.2
Sweetgum	11.7	7.9	3.1	...	4.8	1.9	1.9
Black and tupelo gums	46.4	23.2	12.1	...	11.1	7.5	15.7
Other hardwoods	291.0	149.5	62.8	...	86.7	35.8	105.7
Total	1,489.4	896.4	490.1	...	406.3	279.8	313.2
All species	2,033.0	1,428.4	808.3	41.4	578.7	279.8	324.8

1/ Sound volume in dead trees considered salvagable is not included. This volume is as follows:

Region	Chestnut	Other species
	(Million cubic feet)	
Plateau	13.3	8.7
East	19.1	4.6

Table 9.--Total growing stock by species and stand size, by Survey region, 1950

Species	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Denuded
	Million cubic feet					
PLATEAU						
Softwood:						
Southern pines	187.4	7.8	87.9	89.0	2.5	0.2
Cedar	8.4	3.3	.5	4.1	.5	...
White pine	9.3	...	4.3	4.7	.3	...
Hemlock	22.8	11.7	4.6	4.2	2.0	.3
Total	227.9	22.8	97.3	102.0	5.3	.5
Hardwood:						
Red oaks	249.9	39.4	66.2	140.9	3.4	...
White oaks	246.8	32.4	61.2	147.5	5.7	...
Hickories	162.1	19.6	45.0	94.6	2.8	.1
Yellow-poplar	65.0	11.0	25.0	28.0	1.0	...
Sweetgum	6.8	.5	.9	5.2	.2	...
Black & tupelo gums	36.9	11.8	8.0	16.8	.3	...
Other hardwoods	137.0	40.3	38.5	55.3	2.5	.4
Total	904.5	155.0	244.8	488.3	15.9	.5
All species	1,132.4	177.8	342.1	590.3	21.2	1.0
EAST						
Softwood:						
Southern pines	446.3	40.7	205.2	191.8	8.3	.3
Cedar	10.9	1.8	1.5	7.6	...	...
White pine	43.9	19.9	11.6	12.4	...	...
Hemlock	30.9	11.5	11.2	7.0	1.2	...
Total	532.0	73.9	229.5	218.8	9.5	.3
Hardwood:						
Red oaks	236.2	75.3	52.5	106.1	2.3	...
White oaks	271.5	76.1	63.2	126.0	5.9	.3
Hickories	111.5	25.9	27.5	56.4	1.7	...
Yellow-poplar	96.6	18.1	27.1	50.4	1.0	...
Sweetgum	7.9	1.4	3.2	3.1	.2	...
Black & tupelo gums	23.2	3.3	5.9	13.7	.3	...
Other hardwoods	149.5	31.2	35.8	78.9	3.6	...
Total	896.4	231.3	215.2	434.6	15.0	.3
All species	1,428.4	305.2	444.7	653.4	24.5	.6

Table 10.--Total growing stock by species and Survey region, 1950

Species	Plateau	East
	Million cubic feet	
Softwood:		
Shortleaf pine	123.9	198.2
Virginia pine	63.2	170.9
Other southern pines	.3	77.2
Cedar	8.4	10.9
White pine	9.3	43.9
Hemlock	22.8	30.9
Total	227.9	532.0
Hardwood:		
Black, scarlet, and southern red oaks	188.9	187.9
Cherrybark, Shumard, and northern red oaks	53.4	45.6
Water oaks	7.6	2.7
White oak	114.6	119.8
Other white oaks	132.2	151.7
Hickories	162.1	111.5
Yellow-poplar	65.0	96.6
Sweetgum	6.8	7.9
Black and tupelo gums	36.9	23.2
Elms	11.3	7.9
Soft maples	25.7	30.2
Sugar maple	21.1	9.3
Ash	10.1	15.5
Beech	19.2	10.2
Walnut	7.9	16.8
Sycamore	5.5	1.7
Hackberry	.6	1.2
Other hardwoods	35.6	56.7
Total	904.5	896.4
All species	1,132.4	1,428.4

Table 11.--Average volume per acre of total growing stock by forest type and Survey region, 1950

Forest type	Plateau	East
	Cubic feet	
Softwood types:		
Southern yellow pine	364	516
Cedar	(1/)	(1/)
Other softwood	(1/)	(1/)
Total	368	513
Hardwood types:		
Bottomland hardwood	(1/)	(1/)
Upland hardwood	402	451
Upland hardwood-pine	301	416
Total	371	436
All types	370	467

1/ Sample too small to be reliable.

Table 12.--Sawlog volume by species and tree diameter, by Survey region, 1950

Species	All diameter classes	10-12 inches 1/	14-18 inches	20-24 inches	26 inches and up
	Million board feet				
			PLATEAU		
Softwood:					
Southern pines	534.3	354.1	161.8	9.2	9.2
Cedar	17.6	14.6	3.0	...	...
White pine	28.8	15.8	13.0	...	...
Hemlock	113.6	18.1	30.6	55.9	9.0
Total	694.3	402.6	208.4	65.1	18.2
Hardwood:					
Red oaks	849.4	185.8	470.5	168.7	24.4
White oaks	726.3	169.3	380.3	135.6	41.1
Hickories	494.1	121.6	272.0	68.7	31.8
Yellow-poplar	273.1	56.2	146.7	49.3	20.9
Sweetgum	14.8	6.6	8.2	...	...
Black & tupelo gums	176.1	21.6	90.9	46.1	17.5
Other hardwoods	442.7	77.2	218.0	90.2	57.3
Total	2,976.5	638.3	1,586.6	558.6	193.0
All species	3,670.8	1,040.9	1,795.0	623.7	211.2
			EAST		
Softwood:					
Southern pines	1,448.7	818.9	564.2	65.6	...
Cedar	23.0	16.3	4.3	2.4	...
White pine	215.2	49.0	80.9	63.2	22.1
Hemlock	148.0	36.2	35.0	16.6	60.2
Total	1,834.9	920.4	684.4	147.8	82.3
Hardwood:					
Red oaks	935.2	136.2	505.4	234.4	59.2
White oaks	1,003.3	166.2	508.6	249.5	79.0
Hickories	378.8	71.9	222.2	76.2	8.5
Yellow-poplar	293.9	76.6	144.2	59.5	13.6
Sweetgum	19.9	2.6	6.7	10.6	...
Black & tupelo gums	72.1	12.9	36.5	22.7	...
Other hardwoods	392.3	82.1	226.1	55.7	28.4
Total	3,095.5	548.5	1,649.7	708.6	188.7
All species	4,930.4	1,468.9	2,334.1	856.4	271.0

1/ Hardwood sawlog volume not tallied in trees under 11.0 inches d.b.h.

Table 13.--Sawlog volume by species and stand-size, by Survey region, 1950.

Species	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Denuded
	Million board feet					
PLATEAU						
Softwood:						
Southern pines	534.3	39.0	306.6	180.8	7.2	0.7
Cedar	17.6	11.8	.5	4.0	1.3	...
White pine	28.8	...	12.0	15.5	1.3	...
Hemlock	113.6	65.2	23.1	11.9	11.7	1.7
Total	694.3	116.0	342.2	212.2	21.5	2.4
Hardwood:						
Red oaks	849.4	243.4	268.6	331.7	5.7	...
White oaks	726.3	180.9	210.8	316.4	18.2	...
Hickories	494.1	103.2	158.7	224.7	7.5	...
Yellow-poplar	273.1	68.7	129.7	73.0	1.7	...
Sweetgum	14.8	...	4.6	10.2	...	...
Black & tupelo gums	176.1	75.3	38.4	61.1	1.3	...
Other hardwoods	442.7	201.9	131.3	104.4	5.1	...
Total	2,976.5	873.4	942.1	1,121.5	39.5	...
All species	3,670.8	989.4	1,284.3	1,333.7	61.0	2.4
EAST						
Softwood:						
Southern pines	1,448.7	199.8	772.1	448.0	28.2	0.6
Cedar	23.0	6.2	3.5	13.3	...	...
White pine	215.2	116.4	53.4	45.4	...	...
Hemlock	148.0	69.0	51.0	22.9	5.1	...
Total	1,834.9	391.4	880.0	529.6	33.3	.6
Hardwood:						
Red oaks	935.2	435.6	216.5	277.5	5.6	...
White oaks	1,003.3	423.1	226.7	329.5	23.0	1.0
Hickories	378.8	111.8	95.8	161.2	10.0	...
Yellow-poplar	293.9	79.0	98.4	115.8	.7	...
Sweetgum	19.9	5.2	11.5	2.2	1.0	...
Black & tupelo gums	72.1	18.7	21.8	30.4	1.2	...
Other hardwoods	392.3	135.7	99.4	154.0	3.2	...
Total	3,095.5	1,209.1	770.1	1,070.6	44.7	1.0
All species	4,930.4	1,600.5	1,650.1	1,600.2	78.0	1.6

Table 14.--Sawlog volume by species and Survey region, 1950

Species	Plateau	East
	Million board feet	
Softwood:		
Shortleaf pine	386.1	678.1
Virginia pine	147.2	511.0
Other southern pines	1.0	259.6
Cedar	17.6	23.0
White pine	28.8	215.2
Hemlock	113.6	148.0
Total	694.3	1,834.9
Hardwood:		
Black, scarlet, and southern red oaks	578.1	740.2
Cherrybark, Shumard, and northern red oaks	234.0	184.7
Water oaks	37.3	10.3
White oak	321.5	501.6
Other white oaks	404.8	501.7
Hickories	494.1	378.8
Yellow-poplar	273.1	293.9
Sweetgum	14.8	19.9
Black and tupelo gums	176.1	72.1
Elms	36.4	35.2
Soft maples	42.3	48.1
Sugar maple	55.0	29.7
Ash	27.6	50.5
Beech	115.4	39.3
Walnut	20.4	66.1
Sycamore	23.4	5.5
Hackberry	1.4	5.0
Other hardwoods	120.8	112.9
Total	2,976.5	3,095.5
All species	3,670.8	4,930.4

Table 15.--Average sawlog volume per acre by forest type and Survey region, 1950

Forest type	Plateau	East
	Board feet	
Softwood:		
Southern yellow pine	1,012	1,634
Cedar	(1/)	(1/)
Other softwood	(1/)	(1/)
Total	1,108	1,668
Hardwood:		
Bottomland hardwood	(1/)	(1/)
Upland hardwood	1,429	1,724
Upland hardwood-pine	835	1,408
Total	1,241	1,575
All types	1,201	1,613

1/ Sample too small to be reliable.

Table 16.--Softwood sawlog volume by tree and stand quality, by Survey region, 1950

Species group	All grades	Grade 1	Grade 2	Grade 3	
				In fair and better stands	In poor stands
	Million board feet				
			PLATEAU		
Shortleaf pine	386.1	10.8	117.4	63.4	194.5
Other southern pines	148.2	...	...	9.9	138.3
Other softwoods	160.0	29.4	21.9	40.9	67.8
Total	694.3	40.2	139.3	114.2	400.6
			EAST		
Shortleaf pine	678.1	159.4	144.4	58.4	315.9
Other southern pines	770.6	11.8	71.7	68.4	618.7
Other softwoods	386.2	18.9	50.6	61.1	255.6
Total	1,834.9	190.1	266.7	187.9	1,190.2

Table 17.--Hardwood sawlog volume by log and stand quality, by Survey region, 1950

Species group	All grades	Grade 1	Grade 2	Grade 3 A			Grade 3 B		
				Total	In fair and better stands	In poor stands	Total	In fair and better stands	In poor stands
	Million board feet								
PLATEAU									
Red oaks	849.4	52.7	169.0	524.4	125.5	398.9	103.3	15.7	87.6
White oaks	726.3	70.5	176.5	447.5	95.2	352.3	31.8	6.9	24.9
Hickories	494.1	42.5	109.7	313.1	69.0	244.1	28.8	9.0	19.8
Yellow-poplar	273.1	15.3	57.6	154.3	51.7	102.6	45.9	10.2	35.7
Sweetgum	14.8	...	...	12.6	...	12.6	2.2	...	2.2
Black and tupelo gums	176.1	32.2	41.2	98.7	25.2	73.5	4.0	1.8	2.2
Other hardwoods	442.7	51.4	88.5	259.7	102.0	157.7	43.1	9.7	33.4
Total	2,976.5	264.6	642.5	1,810.3	468.6	1,341.7	259.1	53.3	205.8
EAST									
Red oaks	935.2	82.3	239.4	488.4	193.2	295.2	125.1	41.8	83.3
White oaks	1,003.3	97.3	320.1	537.0	173.8	363.2	48.9	12.5	36.4
Hickories	378.8	28.0	86.4	238.0	81.8	156.2	26.4	4.7	21.7
Yellow-poplar	293.9	19.7	72.9	131.3	43.9	87.4	70.0	13.7	56.3
Sweetgum	19.9	2.0	6.0	4.2	1.5	2.7	7.7	1.2	6.5
Black and tupelo gums	72.1	3.1	23.6	41.7	16.4	25.3	3.7	2.0	1.7
Other hardwoods	392.3	32.2	79.6	259.8	104.7	155.1	20.7	3.9	16.8
Total	3,095.5	264.6	828.0	1,700.4	615.3	1,085.1	302.5	79.8	222.7

Definition of Terms

Forest Land

Forest land. Land which bears forest growth, or land from which the forest has been removed and which has not been put to other use. Each tract classed as forest is at least one acre in size.

Commercial forest land. Forest land bearing, or capable of bearing, timber of commercial quantity and quality, and not withdrawn from commercial timber use.

Reserved-commercial forest land. Forest land in public parks or preserves which qualifies as commercial forest land except that it is withdrawn from commercial timber use through statute, ordinance, or administrative order.

Tree Species

Softwoods. Southern pines, principally shortleaf (Pinus echinata) and Virginia (P. virginiana); eastern white pine (P. strobus); hemlock (Tsuga canadensis); eastern redcedar (Juniperus virginiana); red spruce (Picea rubra); and Fraser fir (Abies fraseri).

Hardwoods. Broadleaved species, of which the most numerous genera or species are the oaks (Quercus spp.); hickories (Carya spp.); and yellow-poplar (Liriodendron tulipifera).

Forest Type

Forest type is determined only from dominant and codominant growing stock and dominant and codominant smaller sound trees of good form.

Southern yellow pine. Stands in which southern pines comprise at least 25 percent of the trees.

Cedar. Stands in which eastern redcedar comprises at least 25 percent of the trees.

Other softwood. Stands in which softwood species other than southern pines or cedar comprise at least 25 percent of the trees. The principal species are eastern white pine and hemlock.

Bottomland hardwood. Stands in which bottomland hardwoods and cypress comprise 76 percent or more of the trees.

Upland hardwood. Stands in which upland hardwoods comprise 76 percent or more of the trees, and no pine is present.

Upland hardwood-pine. Stands in which upland hardwoods comprise 76 percent or more of the trees, and some pine is present.

Class of Timber

Growing stock. Sawlog growing stock is the sawlog portion of sawlog trees. Total growing stock includes sawlog growing stock and upper stems of softwood sawlog trees and entire stems of cordwood trees to a minimum diameter of 4 inches inside bark.

Sawlog tree. A live, merchantable softwood 9.0 inches or larger in d.b.h., or a live, merchantable hardwood 11.0 inches or larger in d.b.h. To be merchantable, the tree must have at least a merchantable 12-foot butt log or 50 percent of its gross volume in merchantable logs.

Cordwood tree. A live tree 5.0 inches or larger in d.b.h., but smaller than sawlog size, which would become a sawlog tree if it should grow to sawlog size.

Cull tree. A live tree 5.0 inches or larger in d.b.h., which because of decay or sound defect fails to meet the specifications for a cordwood or sawlog tree.

Tops and limbs. Upper stems and limbs of hardwood sawlog trees between the top sawlog and a minimum diameter of 4 inches inside bark.

Stand-size Class

Large saw timber. Stands having a net volume of at least 1,500 board feet per acre in sawlog trees and at least half of this volume in softwoods 15.0 inches d.b.h. and larger, and hardwoods 17.0 inches d.b.h. and larger.

Small saw timber. Stands which do not meet the specifications for large saw timber but which do contain a net volume of at least 1,500 board feet per acre in sawlog trees.

Cordwood. Stands below saw-timber specifications, with at least 10 percent of the growing space occupied by growing stock, and with at least 5 percent of the growing space occupied by cordwood trees.

Seedling and sapling. Stands that do not meet saw-timber and cordwood specifications in which at least 10 percent of the growing space is occupied by growing stock and smaller sound trees of commercial species, and with at least 5 percent of the space occupied by seedlings and saplings.

Denuded. Commercial forest land which does not qualify for any other stand-size class.

Tree Stocking

Degree of stocking is determined by the ratio of the actual number of growing-stock and smaller sound trees of good form in the stand to the number of trees of the same size required to occupy the site fully (for best growth). Under this criterion, stands are well stocked when the percentage of full stocking is 70 or above, medium stocked when the percentage is 40 to 69, poorly stocked when the percentage is 10 to 39, and nonstocked when the percentage is under 10.

Volume and Basal Area

Sawlog volume. Net volume in merchantable sawlogs in sawlog trees, measured by the International $\frac{1}{4}$-inch log rule.

Total volume. Volume of sound, usable wood in stems of softwoods and stems and branches of hardwoods between stump and minimum top diameter of 4 inches inside bark, measured in cubic feet.

Basal area. Cross-sectional area of trees at breast height, measured in square feet.

Diameter

D.b.h. (diameter breast high). Tree diameter in inches, outside bark, measured at $4\frac{1}{2}$ feet above ground.

Diameter class. Each 2-inch diameter class includes diameters 1.0 inch below and 0.9 inch above the stated midpoint. E.g., the 12-inch class includes trees 11.0 up to and including 12.9 inches.

Log and Tree Grade

Tree grades for softwoods:

Grade 1 (smooth[1/] trees). Not less than 20 feet of clear bole and at least 40 percent of the merchantable length clear of limbs and knots in sections not less than 8 feet in length. All cedar sawlog trees were graded as No. 1.

Grade 2 (limby trees). Not less than 12 feet of clear bole and 25 to 39 percent of the merchantable length clear of limbs and knots in sections not less than 8 feet in length.

Grade 3 (rough trees). Merchantable trees below grade-2 specifications.

1/ Except as noted in the case of cedar.

Log grades for hardwoods:2/

Grade 1. Logs having five-sixths or more of their length on the 3 best faces in clear-cuttings not less than 3 feet long; they yield at least 65 percent of their volume in No. 1 common and better grades of lumber.

Grade 2. Logs having two-thirds to five-sixths of their entire length on the 3 best faces in clear-cuttings not less than 3 feet long; they yield at least 40 percent of their volume in No. 1 common and better grades of lumber.

Grade 3.--

--A. Logs below grade 2, having ½ or more of their entire length on the 3 best faces in clear-cuttings not less than 2 feet long; they yield at least 13 percent of their volume in No. 1 common and better grades of lumber.

--B. Logs which do not meet the clear-cutting requirements of 3A or higher grades, but which are sound, reasonably straight, and without large knots or knot clusters; they are suitable for ties or low-grade structural timbers.

Stand Quality

Fair and better. A stand in which grade 2 or better hardwood logs or softwood trees are present.

Poor. A stand in which no grade 2 hardwood logs or softwood trees are present.

2/ For detailed external specifications of log grades used, see Forest Service Committee on Interim Hardwood Sawlog Grades, "Interim sawlog grades for southern hardwoods," Southern Forest Experiment Station, 9 pp., illus. Rev. 1948.

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